

Quantitative Hedge Fund Strategies

Discretionary Long-Short Strategy



02

THE TEAM

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TODAY'S AGENDA

Introduction
Data preprocess and Implementation
Results
Conclusion

INTRODUCTION

DESIGNING AND BACKTESTING A DISCRETIONARY LONG/SHORT EQUITY STRATEGY

UNIVERSE DEFINITION:

- Focused on S&P 500 stocks.
- Historical data was retrieved for analysis.

STRATEGY DEFINITION:

- Bottom-up approach targeting individual S&P 500 stocks.
- Strategy revolves around identifying stock's mean return for subsequent quarter.

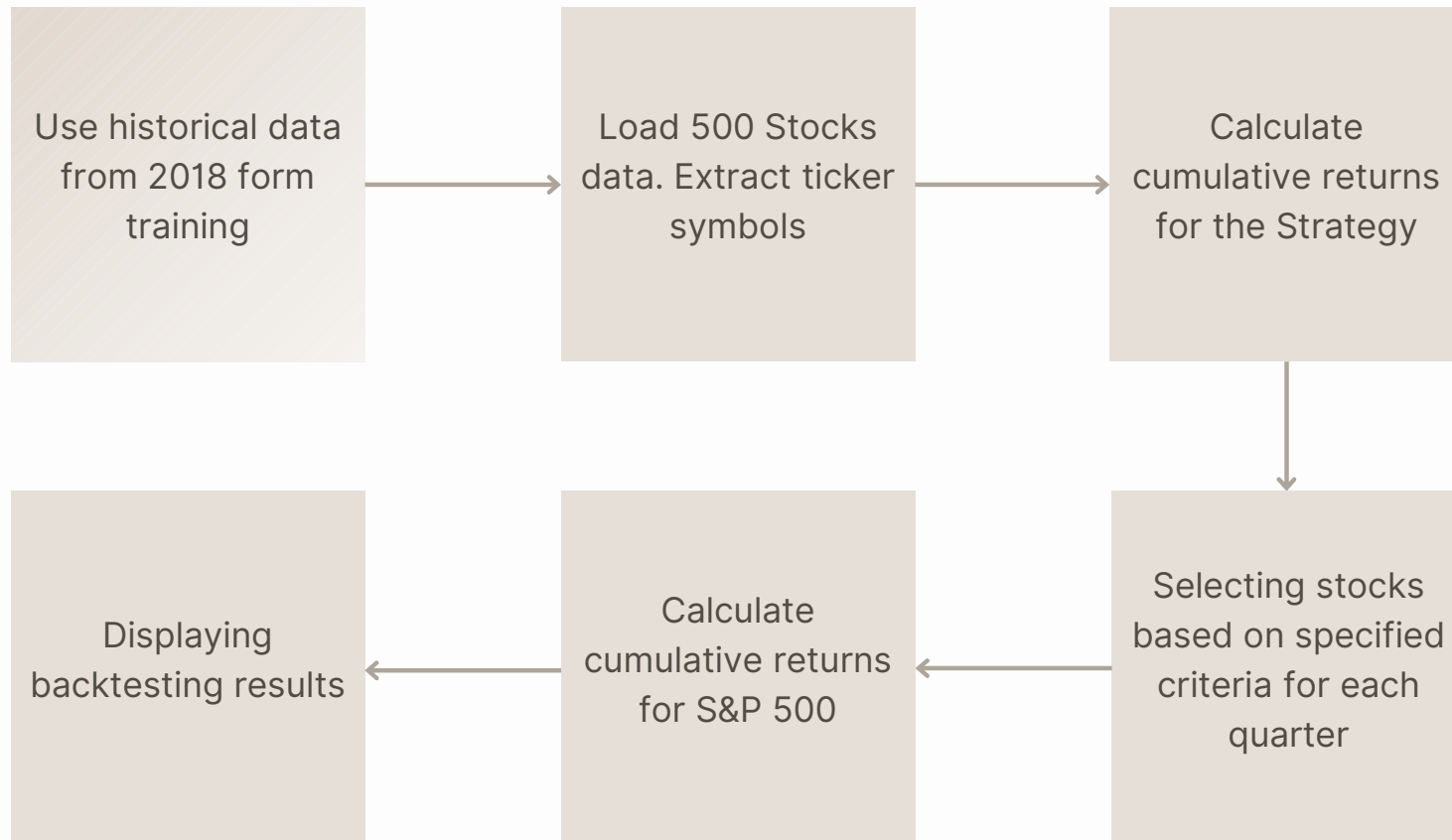
Trading Rules:

- Focus on identifying reversals, emphasizing poor-performing stocks from the preceding quarter.
- Quarterly execution with a one-quarter holding period.

Backtest:

- Cumulative returns calculated for the defined strategy.
- Comparison against S&P 500 benchmark.
- Results visualized through plots, and numerical outcomes stored in a DataFrame.

DATA PREPROCESS AND IMPLEMENTATION

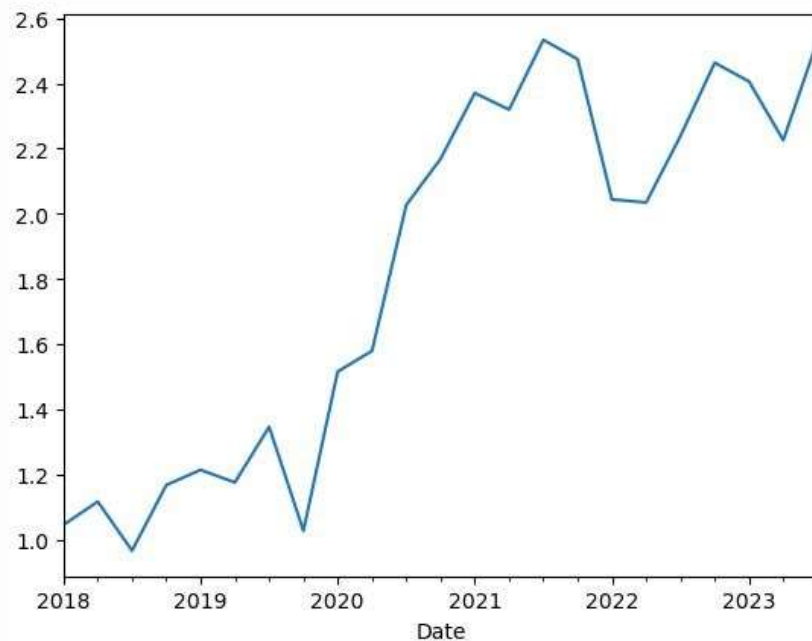


Stock Prices Returns

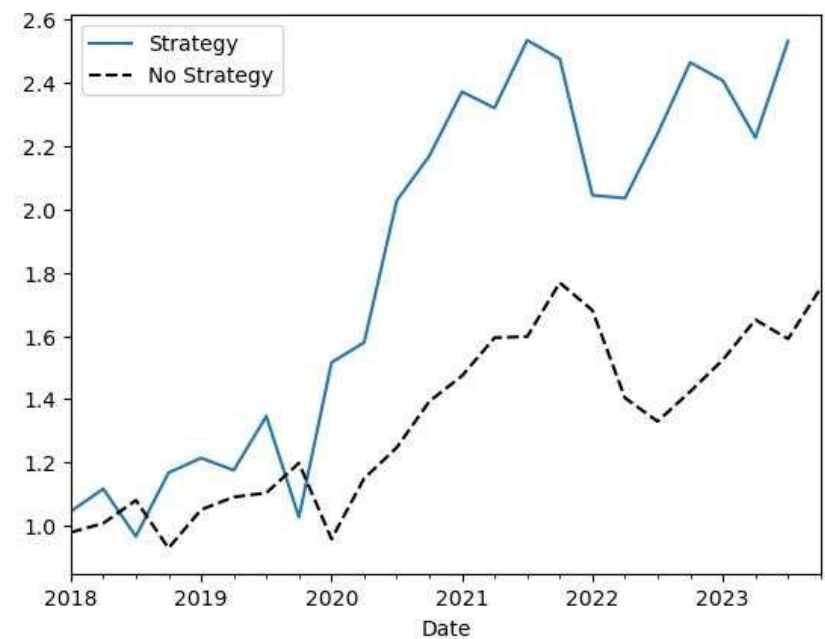
| | AAL | AAPL | ABBV | ABNB | ABT | ACGL | ACN | ADBE | ADI | ADM | ... | WYNN | XEL | XOM | XRAY | XYL | YUM | ZBH | ZBRA | ZION | ZTS |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Date | | | | | | | | | | | | | | | | | | | | | |
| 2018-03-31 | 0.980562 | 0.973993 | 0.961792 | 1.000000 | 1.019221 | 0.969309 | 0.997790 | 1.215982 | 1.009415 | 1.081816 | ... | 1.109921 | 0.951265 | 0.877455 | 0.749330 | 1.130013 | 1.043260 | 0.878930 | 1.342108 | 1.040039 | 1.163578 |
| 2018-06-30 | 0.730562 | 1.103290 | 0.978870 | 1.000000 | 1.017857 | 0.927445 | 1.065733 | 1.128332 | 1.052562 | 1.056721 | ... | 0.917635 | 1.004398 | 1.108833 | 0.870006 | 0.875975 | 0.918830 | 1.022010 | 1.029169 | 0.999241 | 1.020117 |
| 2018-09-30 | 1.088778 | 1.219491 | 1.020831 | 1.000000 | 1.202820 | 1.126606 | 1.040406 | 1.107215 | 0.963928 | 1.096880 | ... | 0.759292 | 1.033494 | 1.027680 | 0.862234 | 1.185367 | 1.162235 | 1.179738 | 1.234415 | 0.951794 | 1.074774 |
| 2018-12-31 | 0.776917 | 0.698769 | 0.974730 | 1.000000 | 0.985960 | 0.896344 | 0.828496 | 0.838081 | 0.928293 | 0.814999 | ... | 0.778451 | 1.043635 | 0.802047 | 0.985956 | 0.835357 | 1.011110 | 0.788925 | 0.900469 | 0.812363 | 0.934251 |
| 2019-03-31 | 0.989100 | 1.204197 | 0.874173 | 1.000000 | 1.105212 | 1.209581 | 1.248280 | 1.177908 | 1.226494 | 1.052721 | ... | 1.206349 | 1.140856 | 1.184924 | 1.332706 | 1.184652 | 1.085836 | 1.231199 | 1.315895 | 1.114629 | 1.176876 |
| 2019-06-30 | 1.026763 | 1.041958 | 0.902345 | 1.000000 | 1.052039 | 1.147277 | 1.049710 | 1.105670 | 1.072195 | 0.945977 | ... | 1.039138 | 1.058353 | 0.948391 | 1.176850 | 1.058198 | 1.108807 | 0.922005 | 0.999809 | 1.012552 | 1.127347 |
| 2019-09-30 | 0.827047 | 1.131619 | 1.041254 | 1.000000 | 0.994887 | 1.132147 | 1.041024 | 0.937553 | 0.989900 | 1.006618 | ... | 0.876845 | 1.090772 | 0.921441 | 0.913468 | 0.951937 | 1.024939 | 1.165874 | 0.985107 | 0.968247 | 1.097806 |
| 2019-12-31 | 1.063404 | 1.311113 | 1.169308 | 1.000000 | 1.038126 | 1.021677 | 1.094723 | 1.193882 | 1.063635 | 1.128561 | ... | 1.277318 | 0.978425 | 0.988245 | 1.061527 | 0.989575 | 0.888037 | 1.090406 | 1.237777 | 1.166217 | 1.062284 |
| 2020-03-31 | 0.425035 | 0.865963 | 0.860515 | 1.000000 | 0.908473 | 0.663558 | 0.775324 | 0.964919 | 0.754376 | 0.759008 | ... | 0.433427 | 0.949756 | 0.544139 | 0.686164 | 0.826628 | 0.680334 | 0.675307 | 0.718760 | 0.515408 | 0.889233 |
| 2020-06-30 | 1.072190 | 1.434583 | 1.288621 | 1.000000 | 1.158662 | 1.006676 | 1.315203 | 1.367867 | 1.367987 | 1.134167 | ... | 1.237581 | 1.036484 | 1.177772 | 1.134690 | 0.997390 | 1.268204 | 1.180847 | 1.394063 | 1.270553 | 1.164415 |
| 2020-09-30 | 0.940321 | 1.269847 | 0.892137 | 1.000000 | 1.190310 | 1.020942 | 1.052487 | 1.126622 | 0.951892 | 1.165163 | ... | 0.964022 | 1.104160 | 0.767665 | 0.992510 | 1.294951 | 1.050512 | 1.140583 | 0.986365 | 0.859412 | 1.206728 |
| 2020-12-31 | 1.283157 | 1.145756 | 1.223313 | 1.014443 | 1.006064 | 1.233162 | 1.155848 | 1.019758 | 1.265462 | 1.084319 | ... | 1.571230 | 0.966092 | 1.200699 | 1.197347 | 1.210057 | 1.189047 | 1.131850 | 1.522340 | 1.486653 | 1.000786 |
| 2021-03-31 | 1.515536 | 0.920567 | 1.009986 | 1.280245 | 1.094529 | 1.063765 | 1.057578 | 0.950512 | 1.049753 | 1.130728 | ... | 1.111141 | 0.997600 | 1.354440 | 1.218678 | 1.033304 | 0.996500 | 1.038873 | 1.262405 | 1.265193 | 0.951541 |
| 2021-06-30 | 0.887448 | 1.121244 | 1.040843 | 0.814835 | 0.967373 | 1.014855 | 1.067113 | 1.231967 | 1.110137 | 1.063158 | ... | 0.975512 | 0.990528 | 1.129858 | 0.991381 | 1.140521 | 1.063320 | 1.004623 | 1.091327 | 0.961790 | 1.183388 |
| 2021-09-30 | 0.967468 | 1.033148 | 0.957653 | 1.095403 | 1.018977 | 0.980483 | 1.085247 | 0.983061 | 0.972816 | 0.990264 | ... | 0.692968 | 0.948695 | 0.932467 | 0.917641 | 1.031010 | 1.063288 | 0.910086 | 0.973427 | 1.170829 | 1.041747 |
| 2021-12-31 | 0.875244 | 1.254912 | 1.255215 | 0.992489 | 1.191399 | 1.164222 | 1.295793 | 0.984958 | 1.049498 | 1.126312 | ... | 1.003422 | 1.083200 | 1.040292 | 0.961068 | 0.969599 | 1.135312 | 0.867997 | 1.154786 | 1.020520 | 1.256979 |
| 2022-03-31 | 1.016147 | 0.983330 | 1.197267 | 1.031653 | 0.840983 | 1.089314 | 0.813485 | 0.803478 | 0.939751 | 1.335405 | ... | 0.937676 | 1.066027 | 1.349730 | 0.882237 | 0.710974 | 0.853594 | 1.036973 | 0.695060 | 1.037999 | 0.772815 |
| 2022-06-30 | 0.694795 | 0.783002 | 0.944791 | 0.518631 | 0.917962 | 0.939488 | 0.823325 | 0.803433 | 0.884429 | 0.859738 | ... | 0.714572 | 0.980463 | 1.036929 | 0.725924 | 0.916960 | 0.957648 | 0.821423 | 0.710539 | 0.776388 | 0.911448 |
| 2022-09-30 | 0.949527 | 1.010825 | 0.876273 | 1.179165 | 0.890566 | 1.001099 | 0.926706 | 0.751789 | 0.953796 | 1.036727 | ... | 1.106178 | 0.904466 | 1.019500 | 0.793451 | 1.117421 | 0.936834 | 0.995146 | 0.891342 | 0.999214 | 0.862703 |
| 2022-12-31 | 1.056478 | 0.940159 | 1.204158 | 0.813976 | 1.134663 | 1.378568 | 1.037077 | 1.222856 | 1.177193 | 1.154133 | ... | 1.308425 | 1.095469 | 1.263315 | 1.123104 | 1.265682 | 1.204439 | 1.219512 | 0.978627 | 0.966575 | 0.988266 |
| 2023-03-31 | 1.159591 | 1.269145 | 0.986139 | 1.454971 | 0.922306 | 1.081077 | 1.071091 | 1.145128 | 1.202341 | 0.857943 | ... | 1.356978 | 0.961917 | 0.994198 | 1.233668 | 0.946911 | 1.031230 | 1.013333 | 1.240201 | 0.608828 | 1.135722 |
| 2023-06-30 | 1.216271 | 1.176289 | 0.845391 | 1.030225 | 1.076634 | 1.102844 | 1.079668 | 1.268884 | 0.987780 | 0.948531 | ... | 0.943705 | 0.921856 | 0.978023 | 1.018839 | 1.075645 | 1.048985 | 1.126935 | 0.930283 | 0.897427 | 1.034667 |
| 2023-09-30 | 0.714047 | 0.882662 | 1.106361 | 1.070615 | 0.888369 | 1.064930 | 0.995236 | 1.042762 | 0.898773 | 0.998147 | ... | 0.875012 | 0.920380 | 1.096317 | 0.853573 | 0.808293 | 0.901768 | 0.770742 | 0.799547 | 1.298958 | 1.010278 |
| 2023-12-31 | 1.138954 | 1.157117 | 1.039045 | 1.073245 | 1.121322 | 0.936771 | 1.115985 | 1.146578 | 1.143241 | 1.013259 | ... | 0.971756 | 1.093499 | 0.863922 | 1.005562 | 1.218609 | 1.049384 | 1.056229 | 1.150636 | 1.308971 | 1.150075 |

24 rows × 499 columns

RETURNS



Graph 1 illustrates the quarterly returns over the past 5 years, showcasing the effectiveness of our stock-holding strategy



Graph 2 compares quarterly returns against the S&P 500 index, offering insights into the relative performance of our strategy in each quarter.

REGRESSION ANALYSIS

OLS Regression Results

| | | | | | | |
|-------------------|------------------|---------------------|----------|-------|--------|--------|
| Dep. Variable: | r-rf | R-squared: | 0.903 | | | |
| Model: | OLS | Adj. R-squared: | 0.899 | | | |
| Method: | Least Squares | F-statistic: | 196.3 | | | |
| Date: | Fri, 15 Dec 2023 | Prob (F-statistic): | 3.99e-12 | | | |
| Time: | 04:38:01 | Log-Likelihood: | -9.2850 | | | |
| No. Observations: | 23 | AIC: | 22.57 | | | |
| Df Residuals: | 21 | BIC: | 24.84 | | | |
| Df Model: | 1 | | | | | |
| Covariance Type: | nonrobust | | | | | |
| ===== | | | | | | |
| | coef | std err | t | P> t | [0.025 | 0.975] |
| ----- | | | | | | |
| const | 0.5294 | 0.108 | 4.916 | 0.000 | 0.305 | 0.753 |
| rm-rf | 1.0179 | 0.073 | 14.009 | 0.000 | 0.867 | 1.169 |
| ===== | | | | | | |
| Omnibus: | 3.516 | Durbin-Watson: | 0.571 | | | |
| Prob(Omnibus): | 0.172 | Jarque-Bera (JB): | 1.569 | | | |
| Skew: | -0.262 | Prob(JB): | 0.456 | | | |
| Kurtosis: | 1.833 | Cond. No. | 2.55 | | | |
| ===== | | | | | | |



RESULTS

| | |
|---|----------|
| Gross Return/ Net return (Transactions costs included) | 16.6997% |
| R squared | 0.903 |
| Tracking Error | 0.3451 |
| Standard Deviation | 0.1498 |
| Drawdown | -0.440 |
| Beta | 0.5294 |
| Alpha | 1.0179 |

Thank you